IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Inventor ..... Hogdal, G.
Group Art Unit 2113
Examiner ..... C. McCarthy
Applicant ..... Microsoft Corporation
Attorney's Docket No. MS1-671USC1
Title: Systems and Methods for Replicating Virtual Memory On A Host Computer and Debugging Using Replicated Memory

RESPONSE TO FINAL OFFICE ACTION DATED APRIL 28, 2006

To: To: Mail Stop AF
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

From: Mark C. Farrell Reg. No. 45,988
(Tel. 509-324-9256x216; Fax 509-323-8979)
Lee & Hayes, PLLC
421 W. Riverside Ave., Suite 500
Spokane, WA 99201

Customer # 22801

INTRODUCTORY COMMENTS

The Applicant appreciates the Patent Office's previous finding of allowable subject matter. This Amendment is in Response to a final Office Action of April 28, 2006. Applicant suggests that the amendments herein should put this application in condition for allowance.

Amendments to the Claims begins on page 3 of this paper.

A **Listing of the Claims** begins on page 4 of this paper.

Remarks begin on page 9 of this paper.

AMENDMENTS TO THE CLAIMS

In accordance with the PTO's amendment format, a detailed listing of all claims has been provided. A status identifier is provided for each claim in parentheses following each claim number.

In the Claims:

Claims 1-13, 15-25 were previously pending.

Please amend claims 1, 6, and 11.

Claim 14 is previously canceled.

Please cancel claims 21-25.

No new claims are added.

Claims 1-13, 15-20 are currently pending.

Listing of the Claims

1. (Currently Amended) A method for debugging a target computer that utilizes virtual memory paging, the method comprising:

replicating on a host computer an address translation table of the target computer, wherein the address translation table establishes on the host computer correspondences between physical memory addresses and virtual memory addresses that existed on the target computer;

transferring physical memory data from the target computer to the [[a]] host computer; and

replicating virtual memory data from the physical memory data on the host computer, wherein the virtual memory data on the host computer is identical to virtual memory data on the target computer.

2. (Original) The method as recited in claim 1, further comprising debugging a fault on the target computer by analyzing replicated data on the host computer.

3. (Original) The method as recited in claim 1, further comprising caching the replicated data in memory on the host computer.

4. (Original) The method as recited in claim 1, wherein the target computer includes an operating system that uses table-driven paged memory management.

5. (Previously Presented) The method as recited in claim 1, wherein:

the target computer includes a processor that has halted execution; and

the virtual memory data is located in physical memory of the target computer.

6. (Currently Amended) A host computing system, comprising:

a processor;

memory;

means for establishing a connection between the memory and memory of a target computer;

a data retrieval component configured to transfer address table data from memory of the target computer to the memory;

an address translation component configured to replicate virtual memory addresses from the address table data in the memory; and

wherein the virtual memory data in the host computing system are identical to virtual memory data of the target computer for debugging the target computer when a CPU of the target computer is halted.

7. (Original) The host computing system as recited in claim 6, further comprising cache memory configured to store the replicated virtual memory addresses.

8. (Original) The host computing system as recited in claim 6, wherein the host-side address translation component is further configured to validate the replicated virtual memory addresses.

9. (Original) The host computing system as recited in claim 6, further comprising a memory management verifier that verifies that a processor of the target computing system has memory management enabled.

10. (Original) The host computing system as recited in claim 6, wherein the means for establishing a connection between the memory and memory of a target computer comprises hardware-assisted debug probes.

11. (Currently Amended) A method, comprising:

accessing address tables from physical memory of a target computer system by reading the target memory directly through an application program interface;

replicating the address tables on a host computing system; and

using data contained in the address tables to derive virtual address data that was used on the target computer system, wherein the virtual address data on the host computer system are identical to virtual address data on the target computer system.

12. (Original) The method as recited in claim 11, further comprising storing the address tables in memory on the host computer system.

13. (Original) The method as recited in claim 11, further comprising caching the virtual address data on the host computer system.

14. (Canceled)

15. (Original) The method as recited in claim 11, further comprising determining if memory management of a target computer system processor is enabled.

16. (Original) The method as recited in claim 11, further comprising performing the method only if memory management of a target computer system processor is enabled.

17. (Original) The method as recited in claim 11, wherein the accessing further comprises:

locating the address tables in physical memory of the target computer system; and

reading the address tables from the target computer.

18. (Original) The method as recited in claim 11, further comprising validating the virtual address data to ensure it is identical to the virtual address data stored on the target computer system.

19. (Original) The method as recited in claim 11, further comprising debugging a fault that occurred on the target computer by analyzing the virtual address data on the host computer system.

20. (Original) A computer-readable medium containing processor-executable instructions that, when executed on a processor, perform the method of claim 11.

21-25. (Canceled)

REMARKS

Claims 1-13, 15-25 were previously pending.

Please amend claims 1, 6, and 11.

Claim 14 is previously canceled.

Please cancel claims 21-25.

No new claims are added.

Claims 1-13, 15-20 are currently pending.

Applicant respectfully requests reconsideration and allowance of the subject application.

1. Double Patenting

Claims 1-13, 15-25 were rejected on the ground of nonstatutory obviousness-type double patenting over claims of U.S. Patent No. 6,766,472. Claims 21-25 are canceled. Base claims 1, 6, and 11 are amended. Applicant submits that the currently pending claims, after amendment, do not double patent the same invention as the claims of U.S. Patent No. 6,766,472. Applicant respectfully requests that the rejection be removed.

2. Statutory 35 USC 101 double patenting

Claims 1-5 were provisionally rejected under 35 USC 101 as claiming the same invention as US Patent Application No. 11/276,644. Applicant suggests that the rejection is moot as base claim 1 has been amended. Claims 2-5 include the language of base claim 1. Thus, Applicant respectfully requests that the rejection be removed.

3. Double Patenting

Claims 6-10 were rejected on the ground of nonstatutory obviousness-type double patenting over claims of U.S. Patent Application No. 11/276,644. However, claim 6 has been amended. Applicant submits that claims 6-10 do not double patent the same invention as the claims of U.S. Patent Application No. 11/276,644. Applicant respectfully requests that the rejection be removed.

Claims 1-13, 15-25 were rejected on the ground of nonstatutory obviousness-type double patenting over claims 1-18 of U.S. Patent Application No. 11/276,633. Claims 21-25 have been canceled.

Applicant respectfully disagrees that given a method claim, an apparatus or module claim to practice the method claim is automatically obvious. However, base claims 1, 6, and 11 have been amended, so Applicant suggests that the rejection is moot. Applicant respectfully requests that the rejection be removed.

4. Patentable Distinction between Related Cases

Regarding sections 7 and 9 of the Office Action, Applicant submits that the claims of U.S. Patent Application No. 11/276,644 and the claims of U.S. Patent Application No. 11/276,633 do not anticipate Applicant's claims because Applicant's unamended claims were filed earlier in time than the claims of U.S. Patent Application No. 11/276,644 and the claims of U.S. Patent Application No. 11/276,633. However, Applicant has amended all the current base claims to more particularly point out and distinctly claim the subject matter.

5. Duty to Disclose

With regard to section 11 of the Office Action, Applicant suggests that typically moving an element from the body of a claim to its preamble, or vice versa, changes the scope of the claim (a preamble is not necessarily an element of its claim). Therefore, Applicant did not intend that claims between related applications should materially affect the patentability of each other and any similarity that is deemed too close is merely an oversight. Thus, there was no duty to disclose the later claims in the earlier application, even though Applicant normally discloses all relationships between applications as a matter of standard practice (see, for example, "related applications" heading and section at the beginning of Applicant's specification).

6. Amendments to Base Claims 1, 6, and 11

Applicant amends the base claims to more particularly point out the subject matter. Specifically, for example in claim 1, by replicating on a host computer an address translation table of the target computer the host computer can replicate an exact or similar condition of the virtual memory set up as it existed on the target computer before the target computer's CPU halted. This allows the target computer to be debugged on a working host computer.

Conclusion

Applicant suggests that all pending claims 1-13 and 15-20 are now in condition for allowance. Applicant respectfully requests reconsideration and issuance of the subject application. If any issues remain that prevent issuance of

this application, the Examiner is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

Date: 6/30/06

By: /Mark C. Farrell/

Mark C. Farrell
Reg. No. 45,988
(509) 324-9256 x 243